Cosmo/ICON NWP test suite

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The Cosmo/ICON NWP test suite(s)

- It is a meteorological test suite aimed at comparing the behavior of new versions of the model with respect to the previous ones in real cases and, in the current phase, to intercompare Cosmo and ICON in fair conditions

- Every test covers 2 months (Jul+Dec 2017), with two different horizontal grid steps ($\approx$7km, $\approx$3km)

- The fine runs are 1-way nested in the corresponding coarse run

- All runs are continuous; a "restart file" is produced every 5 days

- The verification results are periodically collected in a report edited by Amalia.

The Cosmo/ICON NWP test suite(s)

- Horizontal grid steps are comparable for Cosmo and ICON runs ($0.0625°$, $0.0025°$ for Cosmo - R3B8, R2B10 for ICON $\Rightarrow \approx$7km, $\approx$3km)
- Number of vertical levels:
    - 40@7km, 50@3km for both models for a fair comparison
    - ICON is additionally run with a more state-of-the-art 65 levels at both grid steps.
- The suites are implemented on ECMWF systems with cdp/ecflow workflow manager, based on COSMO-LEPS technology
- The HPC resources come from a special project "SPITRASP", renewed for 2021-2023 with $\approx 5 \cdot 10^6$ billing units/year.

ICON test suite

- Ready to run at ECMWF
- ICON version 2.6.1 has been fully tested (Ines) at the beginning of 2021
- We are awaiting requests for new tests
- Cost of a full test $\approx 1.2 \cdot 10^6$ billing units.

Cosmo test suite

- Version 5.08 has been fully tested (Enrico) in March-April 2021, for the first time with the new setup (continuous hindcast run instead of short-range forecasts, restart files, grib2 output)

- The Cosmo test suite is based on the old sms/cdp software which will be dismissed after the migration of ECMWF data center to Bologna

- Cost of a full test $\approx 1 \cdot 10^6$ billing units

Issues

- If we need the test of a "last" Cosmo version it has to be done **very** soon (autumn 2021!), before migration of ECMWF datacenter to Bologna, otherwise a big restructuring of the suite will be required, probably not worth now.

- For 2021 the remaining billing units are $\approx 1 \cdot 10^6$, so if we need to do an ICON test instead, we will have to ask for a small extension.

- The raw ICON test suite output largely exceeds the archiving storage requested for the project at ECMWF, it was proposed to permanently archive only a choice of fields roughly equivalent to the Cosmo test suite output, but no reaction followed. Can we consider this proposal accepted?

Addendum - result of discussion

- There is no need to test the Cosmo version 6.0 since the difference in the results should be limited to sea-ice parameterization which has no impact on the test suite.

- The issue concerning ICON output archiving was actually discussed and there is an overall agreement on archiving only a subset of output data, equivalent to Cosmo test suite output.